

## Three Species of Cepheidae and Cymbaeremaeidae (Acari: Oribatida) from Nippon

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**Abstract** Three species were described or redescribed as members of two genera of Cymbaeremaeidae and a genus of Cepheidae from a natural *Picea* forest at Mt. Hayachine and a natural *Fagus* forest at the Shirakami-sanchi World Heritage Area: *Cymbaeremaeus silva* spec. nov., *Eupterotegaeus armatus* AOKI, 1969, and *Scapheremaeus yamashitai* AOKI, 1970.

**Key words:** *Cymbaeremaeus*, *Eupterotegaeus*, new species, Oribatida, *Scapheremaeus*

In the present work, three species are described or redescribed. Of them, specimens identified as *Eupterotegaeus armatus* AOKI, 1969 and *Scapheremaeus yamashitai* AOKI, 1970 from Mt. Hayachine and the Shirakami-sanchi World Heritage Area, respectively have some characteristic differences from the original descriptions (AOKI, 1969; 1970). Specimens of *Cymbaeremaeus* is described as a new species from Mt. Hayachine

### *Cymbaeremaeus silva* spec. nov.

[Nipponese name: Miyama-kobunedani]

(Figs. 1 & 2)

**Measurements and colour:** Body length, 529–586 µm; width, 307–336 µm (3 exs.). Light yellowish-brown.

**Prodorsum:** Rostrum broadly rounded; setae *ro* on apophyses originating close to anterior rostral margin; setae thick, spiniform, sparsely roughened, dark colour at the distal two-third, and about twice as long as their mutual distance. Curved ridge present transversely between setae *ro* and *le*. Two pairs of low ridges present longitudinally at the lamellar and interlamellar region; outer pair running from the level of setae *le* to bothridia, and inner one arising from insertions of *le* to about halfway along the interlamellar region; short transverse ridges connecting outer ridges with insertions of setae *le*.

Setae *le* and *in* minute, smooth, setiform with apophyses, usually covered with dark coloured sheath-like mem-

brane. Bothridia barrel-like, opening postero-laterally. Sensilli capitate with short thin stem; head granulated in various shape and size, somewhat dark coloured. Relative lengths:  $ro > ss > le > in$ .

**Notogaster:** Ovoid from dorsal view, without humeral protruding; anterior and posterior margins broadly rounded; the former narrower than the latter. The whole surface structure irregularly network-like. Fourteen pairs of setae present; all setae smooth, short, spiniform with apophyses, and usually covered with dark coloured sheath-like membrane. Lyrifissures *im* aligned transversely, *ih*, *ip* and *ips* parallel to lateral dorsal margins. Glands opening antero-laterally to *im*.

**Ventral region:** Surface structure polygonal in various shapes and sizes. Ventral plate rather angular in form, with projection at the posterior end. Anal and genital apertures rectangular, almost touching; the former as wide as but longer than the latter. Ano-genital setae: (2–3–6–1); anal setae variable (1 to 3) in number; all setae smooth, short, spiniform; anal and genital setae arising at the inner margins of plates; setae *ad*<sub>1</sub> in postanal position; *ad*<sub>3</sub> and *ag* lateral to plates; position of *ad*<sub>2</sub> variable from postanal to adanal. Lyrifissure *iad* located obliquely to anal aperture. Acetabular tectum with dents. Setal formula of epimerata: (3–1–2–2); setae smooth, short, setiform; sternal ridges not developed. Diarthric subcapitulum; labium (LI) roundly protruding; insertions of setae *h* and *m* at the same level; setae *a*, *h* and *m* smooth, setiform. Setal formula of pedipalp: (0–2–1–3–9); anteroculinal

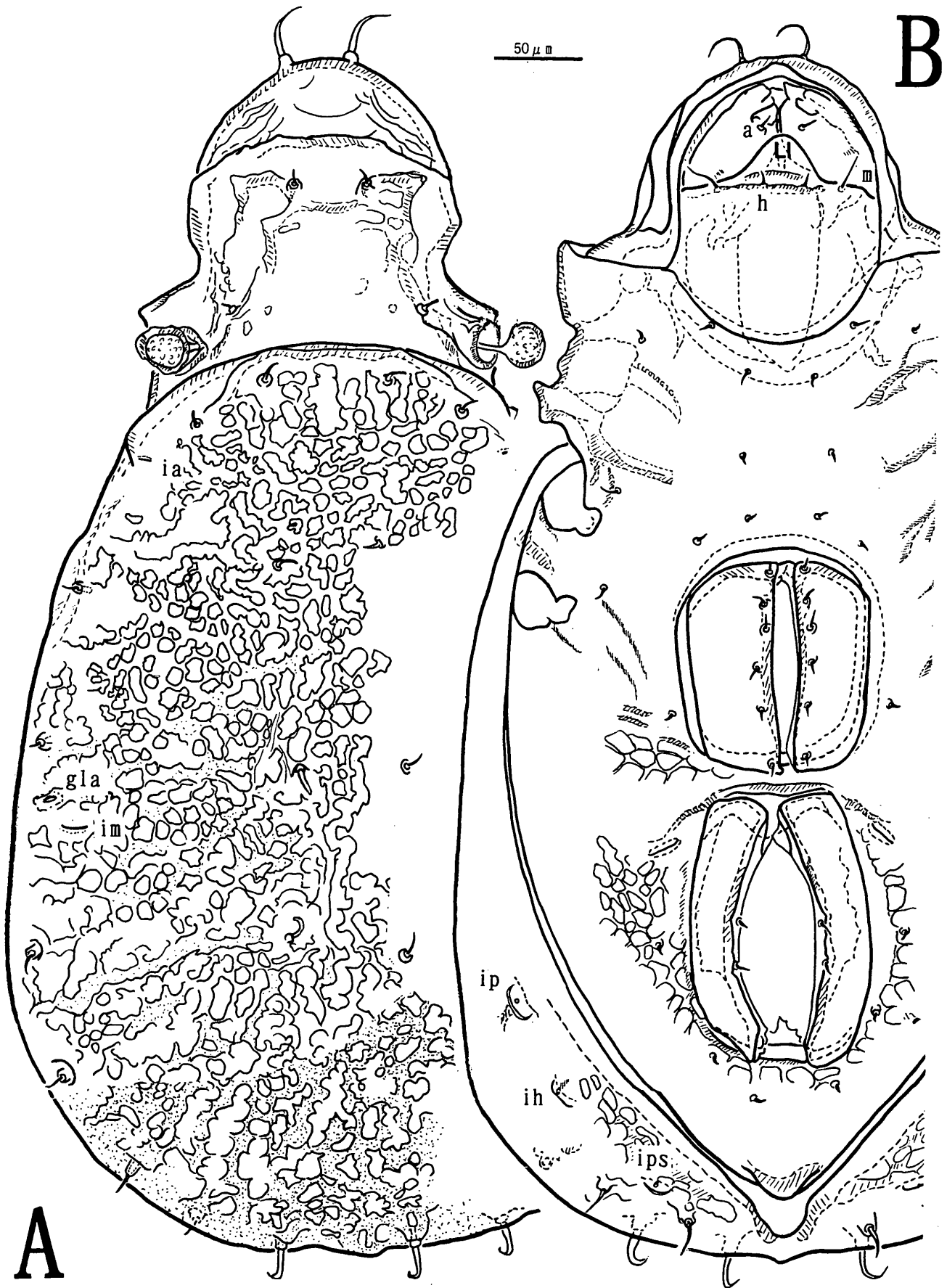
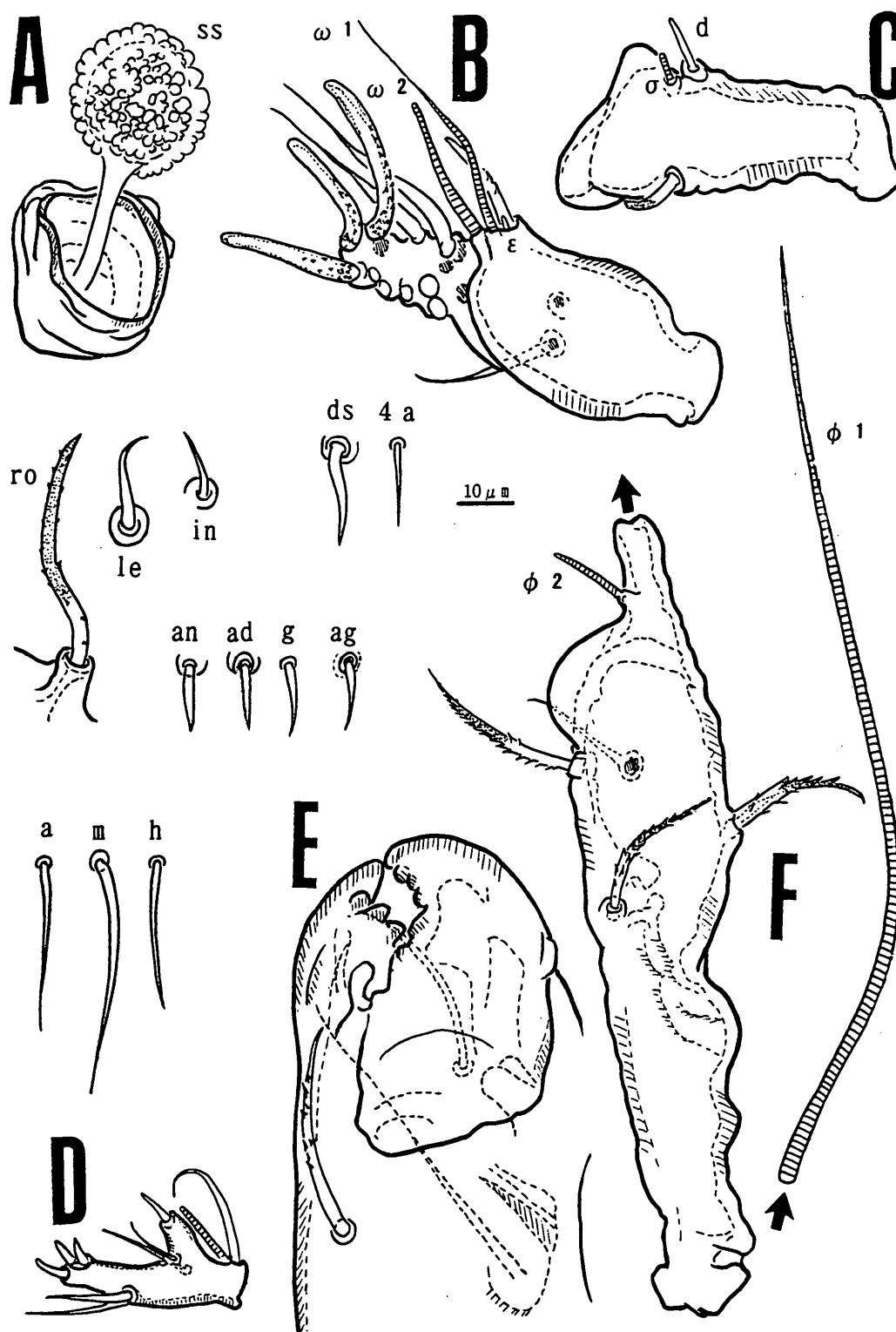


Fig. 1. *Cymbaeremaeus silva* spec. nov. (Holotype). A, Dorsal view; B, Ventral view. LI: labium.



**Fig. 2.** *Cymbaeremaeus silva* spec. nov. (Holotype). A, Principle setae (not depressed). ss: sensillus; ro: rostral seta; le: lamellar seta; in: interlamellar seta; ds: dorsal seta; 4a: epimeral seta; an: anal seta; ad: adanal seta; g: genital seta; ag: aggenital seta; a, m and h: anterior, medial and posterior infracapitular setae, respectively. B, Tarsus I; C, Genu I; D, Tarsus of pedipalp; E, Chelicera; F, Tibia I.

seta arising from the tip of markedly large protrusion. Relative lengths of principal setae:  $m > a > h > ge \doteq 4a \geq ag > an \doteq ad$ .

**Legs:** All legs homotridactylous; claws dark coloured; dents of claws arranged in two rows at the dorsal side and scattered densely at the whole basal surface. Leg chaetotaxy including famulus, but excluding solenidia, I (1-3-2-4-16), II (1-3-2-4-14), III (2-2-1-2-14), IV (1-2-2-2-12). Solenidiotaxy, I (1-2-2), II (1-1-2), III (1-1-0), IV (0-1-0). Tarsus I with 2 protrusions; solenidion  $\omega_1$ , famulus  $\varepsilon$  and seta  $ft$  "originating from one protrusion; famulus  $\varepsilon$  minute, rod-like, inserted between  $\omega_1$  and  $ft$ ";  $\omega_1$  long, setiform;  $\omega_2$  bacilliform, inserted on the other protrusion, located antero-laterally to  $\omega_1$ . Solenidion  $\phi_1$  arising from a large distal protrusion of tibia I;  $\phi_2$  inserted at the base of the protrusion. On genu I, solenidion  $\sigma$  inserted anterior to and not coupled with seta  $d$ .

**Material examined:** Holotype (NSMT-Ac 11278) from H, F and A layers at the forest floor of a natural *Picea glehnii* MASTERS Forest about 1,350 m above the sea, Mt. Hayachine in Iwate Pref., 6-XI-2000, Yoshinori NAKAMURA; 1 paratype (NSMT-Ac 11279): the same data with the holotype, but from a tukmor on tree; 2 paratypes, the same data with the holotype but T. FUJIKAWA. Types are deposited in the National Science Museum, Tokyo.

**Remarks:** The new species is similar to the type species of the genus *Cymbaeremaeus cymba* (NICOLET, 1855) according to MICHAEL (1888) and WOAS (2000). The former is distinguished, however, from the latter by shape and insertion of rostral setae, absence of humeral protruding, number and shape of notogastral setae, shape and length of leg setae and solenidia, and leg chaetotaxy.

### *Eupterotegaeus armatus* AOKI, 1969

(Figs. 3-5)

*Eupterotegaeus armatus* AOKI, 1969, p.129, figs. 30-33.

**Supplementary description:** In dorsal aspect, rostrum seemed slightly protruding, where with rostral setae ( $ro$ ) located at the lateral sides. But when depressed, rostrum concave at the anterior margin and setae  $ro$  inserted behind the anterior margin for enough distance. Setae  $ro$  densely barbed, shorter than their mutual distance, and inserted on apophyses. A wedge-like structure usually

observed at the furrow between the apophyses in dorsal aspect. Prodorsum irregularly indented at the lateral margin and granulated at the lateral sides. Lamellae broad with long cuspides, situated at the lateral sides of prodorsum, removed from each other. Cuspides tapering and extending in front of anterior rostral margin. Median spine sword in form, reaching at the level of crossing tips of cuspides. Setae  $le$  thin, sparsely barbed, tapering, swollen at the base, and about 1.4× as long as the tip of cuspides beyond insertions of setae  $le$ . Interlamellar region smooth with a few light spots between interlamellar setae ( $in$ ); setae  $in$  thick and short bearing a few minute barbs. Bothridia barrel-like, situated at the base of lamellae, opening anteriorly. Sensilli ( $ss$ ) capitate, spinose; spines thick, short and crowded. Relative lengths:  $le > ss > ro > in$ . Notogaster having ten pairs of setae inserted along lateral margin; setae  $ta$  smooth, short without apophyses; the remaining setae thick, barbed on apophyses, about 2× as long as seta  $ta$ . Lyrifissures  $ia$  situated postero-laterally to  $ta$ ;  $im$  transversely, inside and almost at the middle between setae  $ti$  and  $ms$ . Ano-genital setae: (2-3-6-1); setae smooth, setiform. Acetabular tectum with dents. Setal formula of epimerata: (3-1-4-3); setae smooth, spiniform; setae  $1b$ ,  $3c$  and  $4a-c$  longer than the remainder;  $4a$  the longest. Diarthric subcapitulum; infracapitular setae,  $a$ ,  $m$  and  $h$  smooth, spiniform. Setal formula of pedipalp (0-2-1-3-9). Relative lengths:  $a > ad \geq ge \doteq 4b \geq m > an \doteq h > ag$ . All legs heterotridactylous; median claw as thick as but longer than lateral ones; all claws minutely dentate at dorsal side. Leg chaetotaxy including famulus, but excluding solenidia, I (1-4-3-4-18), II (1-4-3-4-14), III (2-3-2-3-14), IV (1-2-3-3-12); the number variable on trochanter III. Solenidiotaxy, I (1-2-2), II (1-1-2), III (1-1-0), IV (0-1-0). On tarsus I, famulus  $\varepsilon$  inserted laterally between solenidion  $\omega_1$  and seta  $ft$ ;  $\omega_2$  antero-laterally to  $\varepsilon$ . On tibia I, two solenidia coupled together. Solenidion on genu I long. Trochantera III and IV with keels; dorsal one pointed and ventral one wide and finny.

**Locality:** 1 ex. (NSMT-Ac 11276) from H, F and A layers around the root of *Picea glehnii* MAST. tree in natural *Picea glehnii* forest, Mt. Hayachine in Iwate Pref., 16-V-2000, Tokuko FUJIKAWA; 1 ex. (NSMT-Ac 11277) and 23 exs.: the same data with the above mentioned data but including samples from a hollow of a standing tree, 6-XI-2000. Two specimens (NSMT-Ac 11276 and 11277) are deposited in the National Science

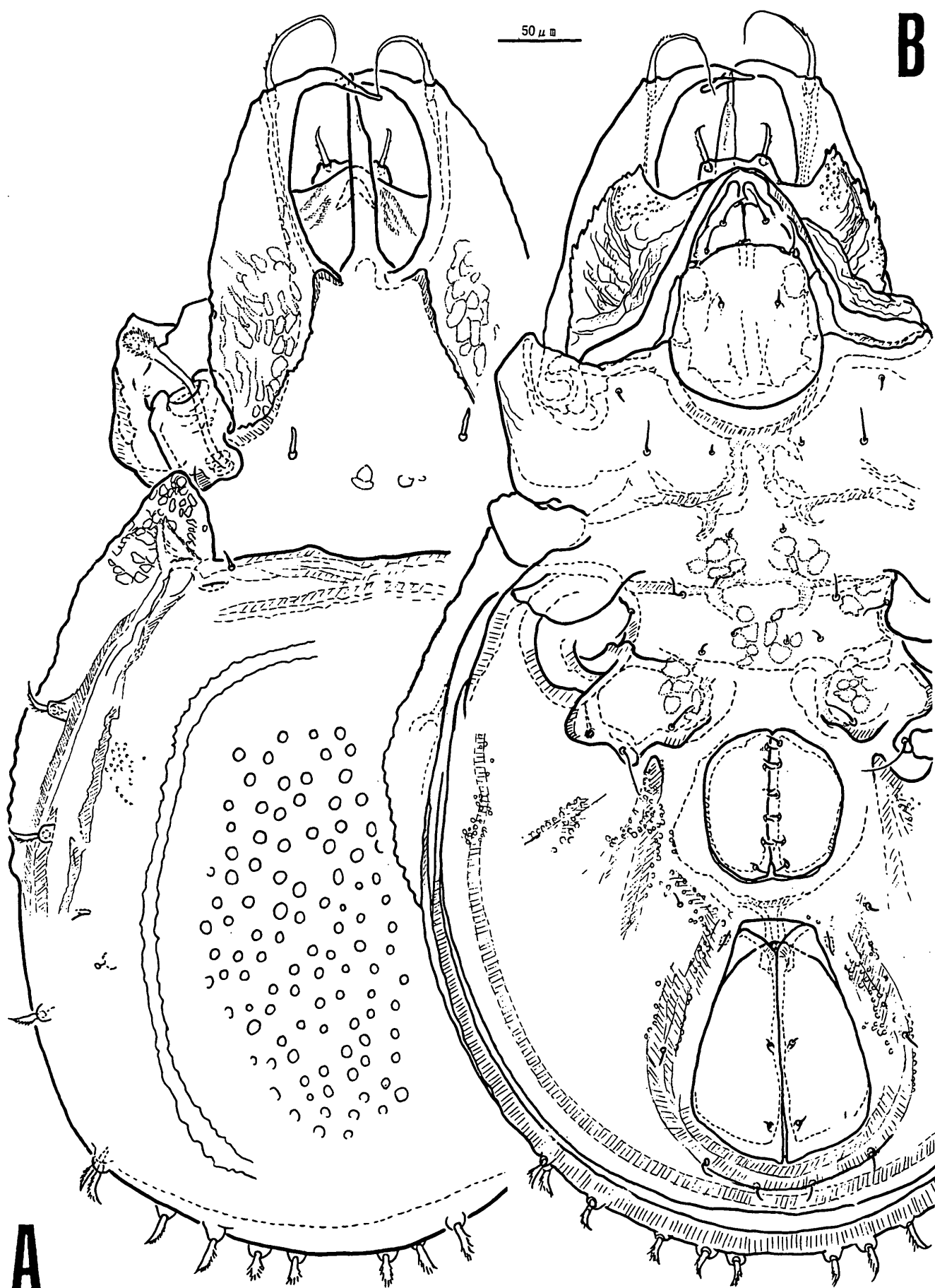
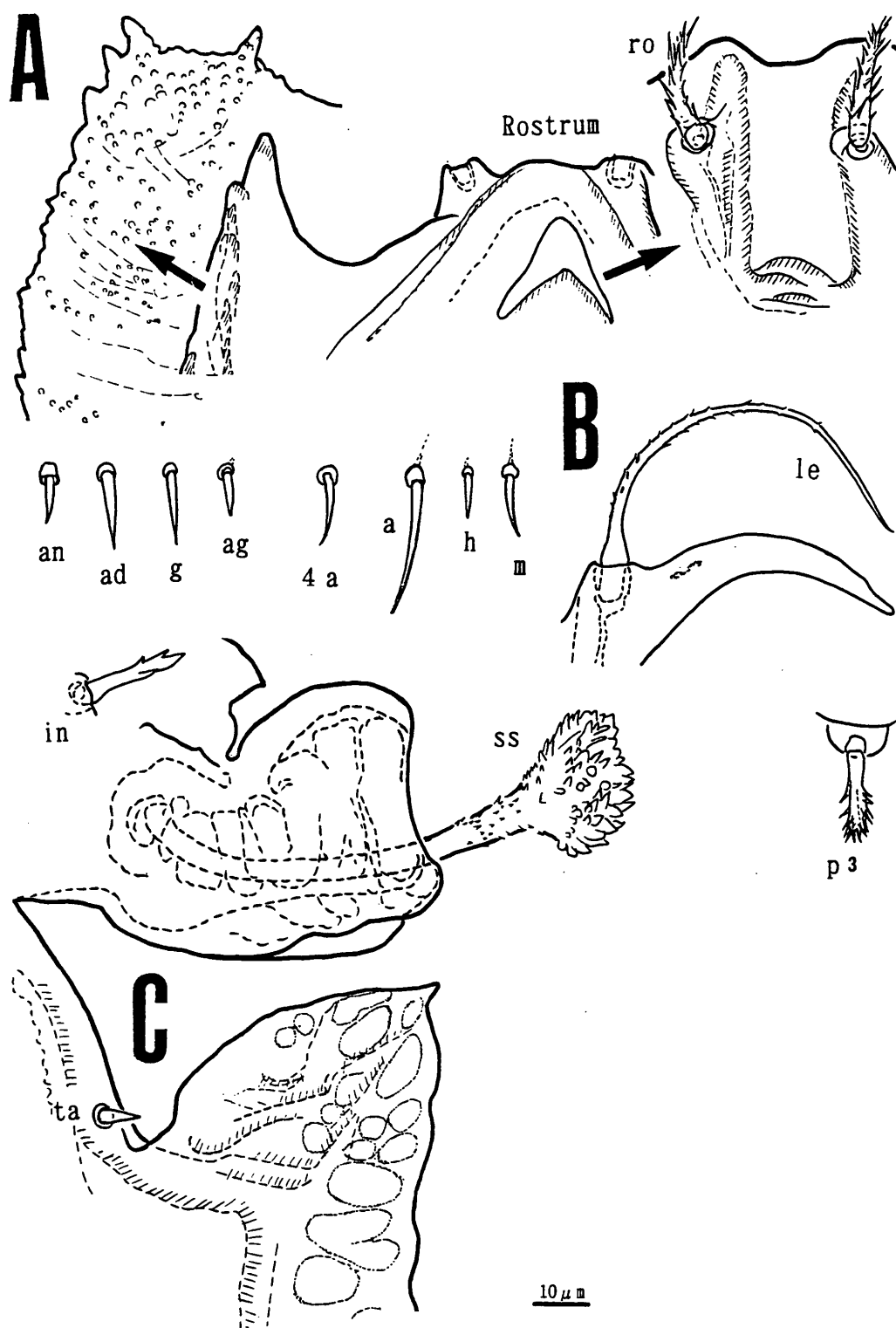


Fig. 3. *Eupterotegeus armatus* AOKI, 1969. A, Dorsal view; B, Ventral view.



**Fig. 4.** *Eupterotegaeus armatus* AOKI, 1969. A, Rostrum under normal and flattened conditions (black allow); B, Principle setae. *an*: anal seta; *ad*: adanal seta; *g*: genital seta; *ag*: aggenital seta; *4a*: epimeral seta; *a*, *m* & *h*: anterior, medial and posterior infracapitular setae, respectively; *le*: lameral seta; *p3*: dorsal seta; C, Right bothridial and humeral region.

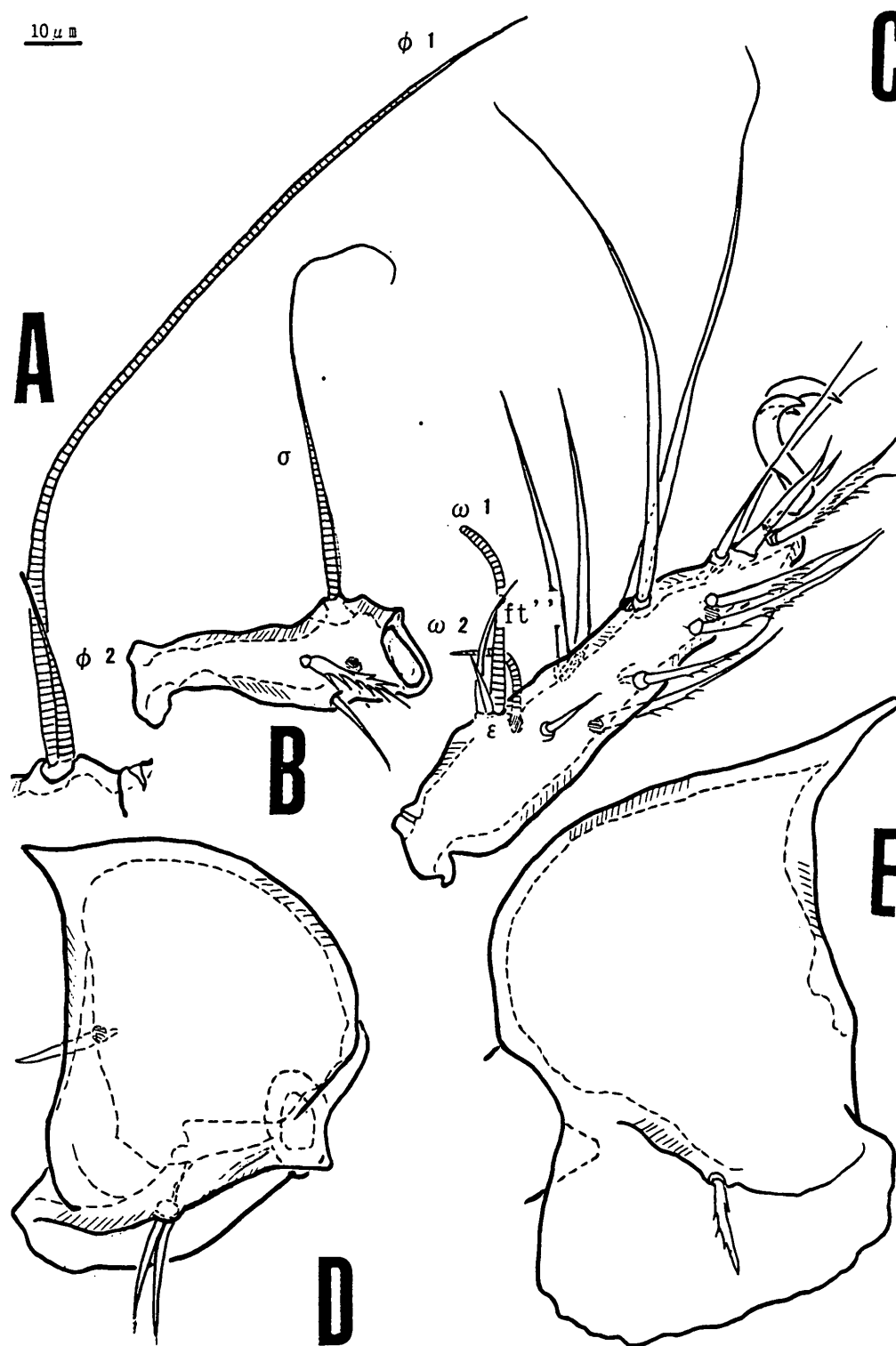


Fig. 5. *Eupterotegaeus armatus* AOKI, 1969. A, Solenidia on tibia I; B, Genu I; C, Tarsus I; D, Trochanter III; E, Trochanter IV.

Museum, Tokyo.

**Measurements and colour:** Body length (cuspides not included), 536 (564) 592  $\mu\text{m}$ ; width, 300 (332) 393  $\mu\text{m}$  (19 exs.). Light reddish-brown. The whole body covered with external membrane.

**Distribution:** Nippon.

**Remarks:** The present specimens differ from the original description in having rostrum concave at the anterior margin, long median spine on the translamellar region, short rostral setae, and ten pairs of notogastral setae.

***Scapheremaeus yamashitai* AOKI, 1970**

(Figs. 6 & 7)

*Scapheremaeus yamashitai* AOKI, 1970, p.595, figs. 28–31.

**Supplementary description:** Surface sculpture dark rugose. Rostrum rounded. Setae *ro* thick, spiniform, sparsely and minutely roughened, shorter than their mutual distance, arising from almost anterior rostral margin without apophyses. Lamellar and translamellar ridges present. Setae *le* smooth, spiniform on apophyses, covered with dark coloured sheath-like membrane. Setae *in* smooth, spiniform, very minute, without apophyses. Bothridia cup-like, opening laterally. Sensilli capitate with very short stem; head black, granulated, larger than the size of bothridial opening. Notogaster elliptical in shape with angular humeral protrusions directed laterally. Central area surrounded with elliptical ridge. Surface structure dark rugose at marginal zone and light alveolate variably in size and form at the central zone. A large rectangular lenticulus present at the anterior marginal zone. Ten pairs of dorsal setae smooth, short, spiniform, covered with dark coloured sheath-like membrane on small apophyses; *p*-series setae without membrane. Setae *ta* and *te* inserted in the marginal zone; setae *ti* and *ms* at the surrounding ridge. Lyrifissures *ia* located antero-laterally to setae *ta* at the root of humeral protrusions; *im*, *ih* and *ip* obliquely to lateral notogastral margins and *ips* longitudinally. Glands opening at the level of setae *ti* in marginal zone. Surface structure of ventral region dark rugose. Anal aperture roughly circular in shape, and genital one rectangular; the interspace between them about 0.5 $\times$  and 0.6 $\times$  as wide as length of anal and genital apertures, respectively. Anogenital setae: (2–3–6–1); setae *an* and *g* inserted close to

the inner margins of plates; setae *ad*<sub>1</sub> in postanal position; *ad*<sub>2</sub> and *ad*<sub>3</sub> located postero-laterally and laterally to anal aperture, respectively; setae *as* postero-laterally to genital aperture. Lyrifissure *iad* parallel to antero-lateral margin of aperture. Acetabular tectum with dents. Setal formula of epimerata: (3–1–2–2); sternal ridges weakly developed. Diarthric subcapitulum. All ventral setae smooth, thin, short, setiform. Setal formula of pedipalp: (0–2–1–3–9). Relative lengths:  $g > a > 4b \geq an > ag > h > ad > m$ . All legs heterotridactylous; median claw dentate at the dorsal side, thicker and longer than lateral ones. Leg chaetotaxy including famulus, but excluding solenidia, I (1–4–2–4–17), II (1–4–2–3–16), III (2–2–1–3–14), IV (1–2–2–3–14). Solenidiotaxy, I (1–2–2), II (1–1–2), III (1–1–0), IV (0–1–0). On tarsus I, solenidia, famulus and seta *ft*'' inserted close together; solenidia and seta *ft*'' not pointed. Solenidion  $\omega_1$  about 2 $\times$  as long as  $\omega_2$ ;  $\omega_2$  as long as *ft*'''. Famulus  $\epsilon$  minute spiniform, inserted between  $\omega_1$  and seta *ft*'''. On tibia I, solenidia flagelliform;  $\phi_1$  arising from a distal protrusion and  $\phi_2$  laterally from half-way along length of the protrusion, about 0.2 $\times$  as long as  $\phi_1$ . On genu I, 2 setae smooth and short, separated from solenidion.

**Locality:** 1 ex. (NSMT-Ac 11280) from H, F and A layers at the forest floor of a natural *Fagus crenata* BLUME forest at the Shirakami-sanchi World Heritage Area in Aomori Pref., 3-X-1999, T. FUJIKAWA; 1 ex. (NSMT-Ac 11281) from L, F, H and A layers of cut-over area at the Origin of Mogami River in Yonezawa City, Yamagata Pref., 18-VI-2000, T. FUJIKAWA. Specimens are deposited in the National Science Museum, Tokyo.

**Measurements and colour:** Body length, 393, 450  $\mu\text{m}$ ; width, 193, 214  $\mu\text{m}$  (2 exs.). Dark-brown.

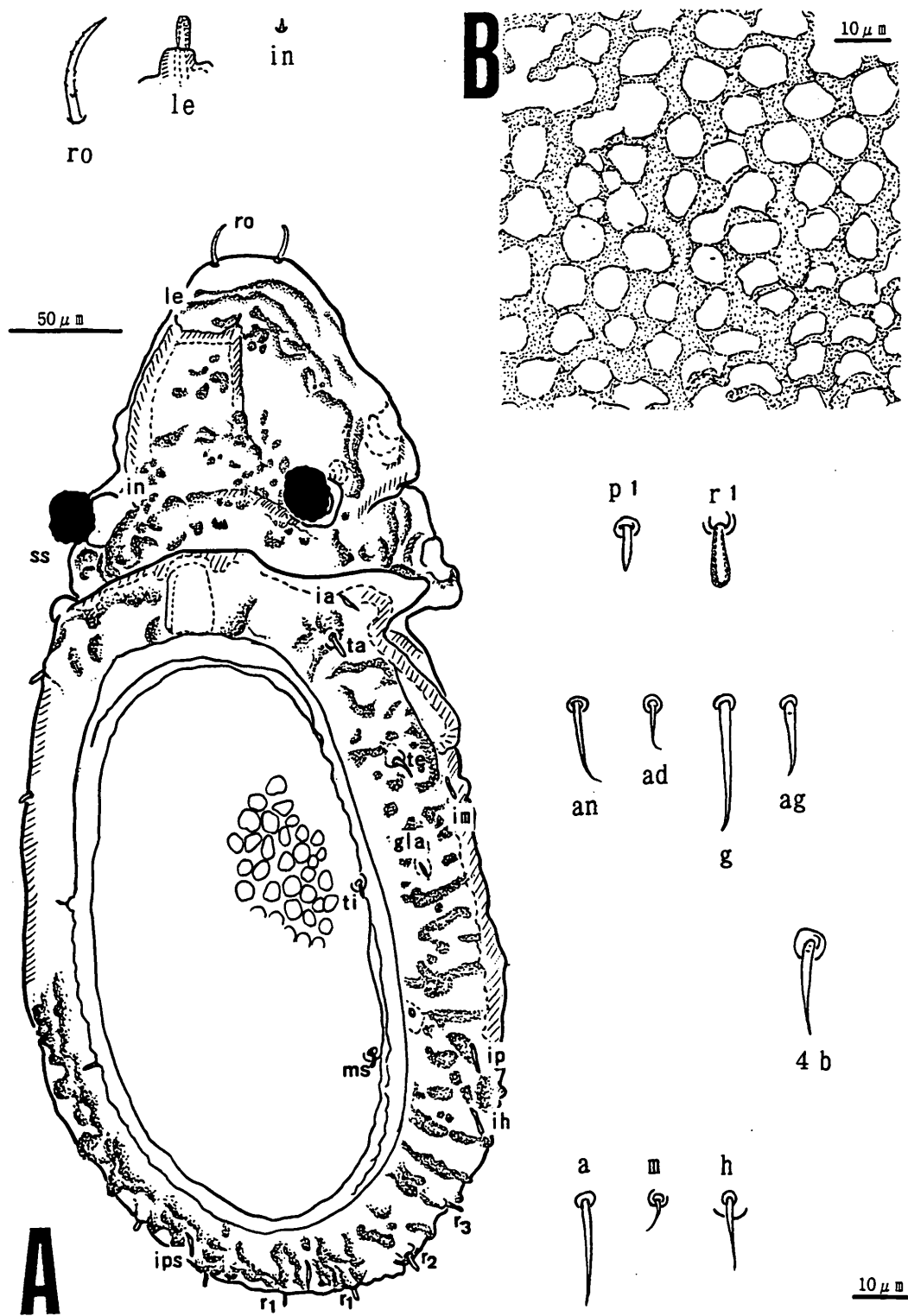
**Distribution:** Nippon.

**Remarks:** The present specimens differ from the original description in having rugose structure of prodorsal and ventral surface, large sensilli, and rounded humeral protrusions.

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**Fig. 6.** *Scapheremaeus yamashitai* AOKI, 1970. A, Dorsal view; B, Microsculpture on central zone of notogaster, and principle setae. *ro*: rostral seta; *le*: lamellar seta; *in*: interlamellar seta; *p*<sub>1</sub> & *r*<sub>1</sub>: dorsal setae; *an*: anal seta; *ad*: adanal seta; *g*: genital seta; *ag*: aggenital seta; *4b*: epimeral seta; *a*, *m* & *h*: anterior, medial and posterior infracapitular setae, respectively.

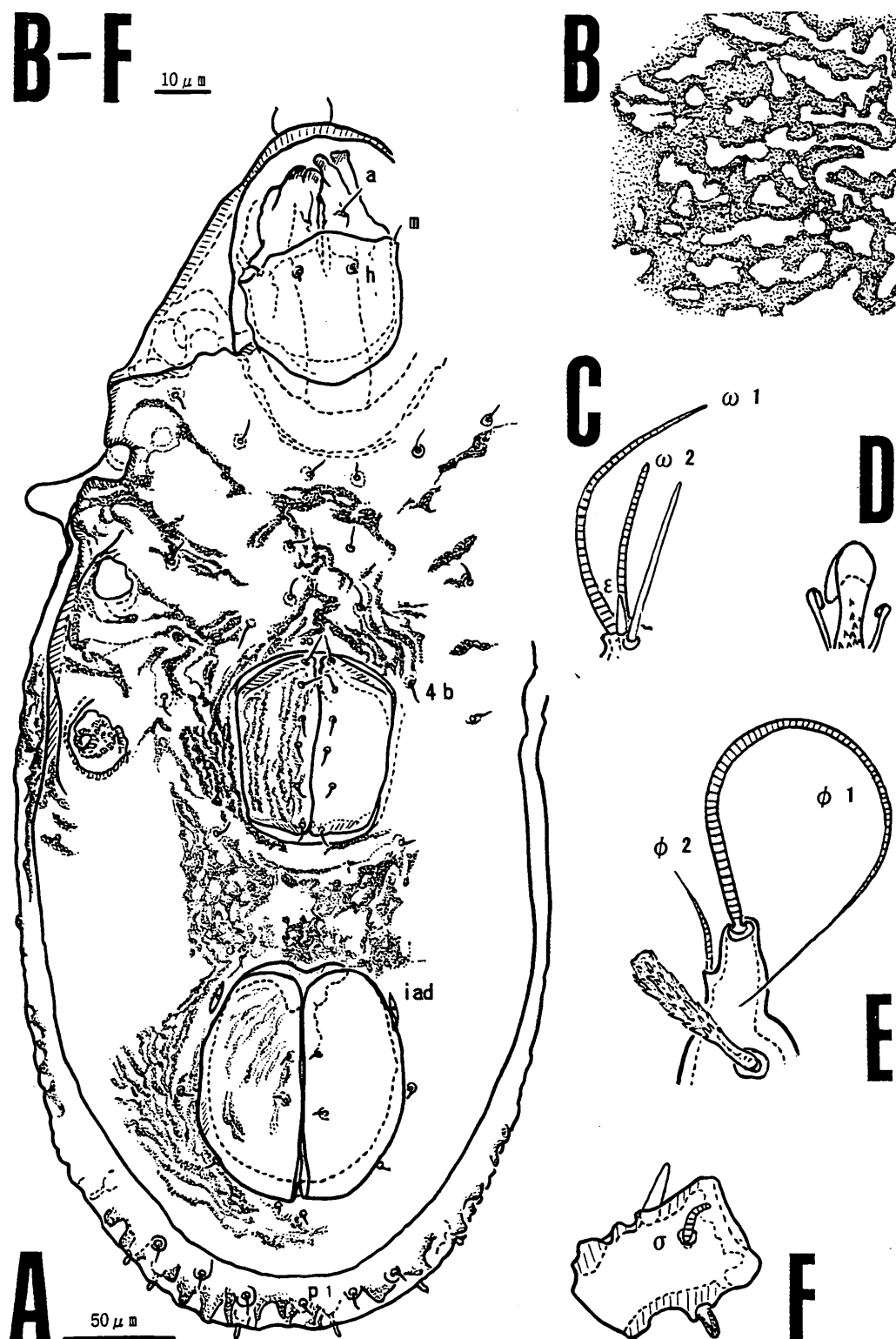


Fig. 7. *Scapheremaeus yamashitai* Aoki, 1970. A, Ventral view; B, Microsculpture on ventral plate; C, Solenidial region on tarsus I (not depressed); D, The tip of claws; E, The tip of tibia I; F, Genu I.

## 摘 要

藤川徳子（〒791-0203 愛媛県温泉郡重信町大字横河原 1375 愛大横河原宿舎 1-115）：日本産マンジュウダニ科とスッポダニ科の 3 種.

*Edaphologia* No. 69: 13-23, 2002.

岩手県早池峰山アカエゾマツ自生南限地から、コブネダニ属（新称）ミヤマコブネダニ（新称）*Cymbaeremaeus silva* spec. nov. とキバダニ *Eupterotegaeus armatus* AOKI, 1969 を、そして白神山地世界遺産地域のブナ林と最上川源流地の開地からヤマシタスッポダニ *Scapheremaeus yamashitai* AOKI, 1970 を採集したので、新種記載と再記載を行った。

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